

1 PURPOSE AND NEED FOR ACTION



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This chapter states the proposed action, the purpose, and the need for that action. Background information is provided on the Boise Project and the problems experienced with the operation of the Arrowrock Dam **outlet works**.¹ In addition, scoping activities, other actions and activities related to the outlet work rehabilitation, legal authorities and constraints, and the organization of this Environmental Impact Statement (EIS) are summarized.

Proposed Action

The Bureau of Reclamation (Reclamation) proposes to rehabilitate the Arrowrock Dam outlet works by removing the 10 lower level **Ensign valves** and replacing those valves with 10 **clamshell gates**. The other outlets, 10 upper level **conduits** controlled by Ensign valves and the 5 **sluice** outlets controlled by **sluice gates** would be abandoned but left in place. During construction, the rehabilitation would require operational changes of the Boise River/reservoir system, including a prolonged **drawdown** of Arrowrock Reservoir.

The purpose of the proposed action is to enable Reclamation to continue to operate Arrowrock Dam and Reservoir to meet the project purposes of irrigation and flood control.

Need for Action

The current condition of the Arrowrock Dam outlet works presents an increasingly difficult maintenance problem. The Ensign valves, which control releases from the dam, have been in use since 1915 and have exceeded the design life (50 years) of such valves (see figure 1-1). Most of the valves have been damaged through prolonged use, and three valves in the lower row are currently out of service. The sluice gates on the sluice outlets, which are needed to empty the reservoir for inspection and maintenance of the lower level Ensign valves, are also damaged. Two of the five sluice gates are capable of only limited service due to a deteriorated condition. Based on the results of the last inspection (1987), major repairs and rehabilitation of the existing 20 valves and 5 sluice gates are needed to assure continued reliability over the long term.

The current condition of the valves also poses a problem related to potential failure. Failure of the valves in a closed position could result in not being able to maintain sufficient space for flood control and failure in the open position could result in loss of water for irrigation.

Maintenance procedures, which call for inspection and repair of the lower row of Ensign valves every 6 years, require that Arrowrock Reservoir be drawn down to a very low level. Drawdown to the required level for inspection and repair is a problem because the sluice gates, which must be operated to lower the reservoir level, also need repair. There are also environmental concerns associated with the drawdown of the reservoir and use of the sluice gates. Use of the sluice gates flushes **sediment** downstream. Extreme drawdowns and use of the sluice gates for inspection

¹Bolding is used to highlight the first appearance of technical terms. These terms are explained in the Glossary.

and maintenance adversely affect bull trout, which are listed as threatened under the Endangered Species Act (ESA), and other fish and water quality. In anticipation of a long-term solution to the maintenance problem, Reclamation has deferred inspection and maintenance of the lower Ensign valves since 1988.

The condition of the lower Ensign valves inhibits Reclamation's ability to release sufficient flow to meet project purposes under some conditions. Due to susceptibility to damage, the lower bank of Ensign valves cannot be used under high pressure conditions, e.g., when the reservoir is nearly full. In years with high runoff, this operational constraint reduces the ability to release water for flood control operations.

Restricted flow capacity is also a problem in drought years. This occurs when there is a low head differential between Arrowrock and Lucky Peak. Under that condition it is not possible to pass adequate flows through Arrowrock Dam while maintaining the Lucky Peak Lake **elevation** for recreation. When Arrowrock Reservoir is at a target conservation pool elevation of 3078 and Lucky Peak is at a full pool of 3055, the seven operational valves can only pass 2,900 cfs. That contrasts with an irrigation demand of about 4,300 cfs. The proposed clamshell gates will allow a release of about 5,000 cfs in this scenario.

Because of the condition and age of the valves it is possible that some of the lower valves could malfunction and stick in either the open or closed position, requiring unplanned reservoir drawdown to repair the valves. Valves stuck in either position would reduce flood control flexibility and could result in some increased downstream flooding. Stuck valves during the irrigation season could also affect irrigation water deliveries.

Background

Location and Setting

The Boise River system in southwest Idaho consists of four major streams. Flowing generally southwest, the North Fork Boise River joins the Middle Fork Boise River about 18 **river miles** upstream and northwest of Arrowrock Dam. Flowing generally northwest, the South Fork Boise River joins the Middle Fork about 4 river miles upstream of Arrowrock Dam to form the main stem Boise River. The confluence now lies within the Arrowrock Reservoir pool. Mores Creek, flowing south, joins the main stem Boise River about 9 river miles downstream from Arrowrock Dam within the Lucky Peak Lake pool. The main stem flows generally westward past the cities of Boise and Caldwell to merge with the Snake River at the Idaho-Oregon border (see Location map).

The sparsely populated river basin upstream from the city of Boise is rugged, consisting mostly of narrow valleys and forested lands. Downstream of Lucky Peak Dam, the valley is wide and has been developed as one of the major agricultural areas in Idaho. This area, commonly called the Treasure Valley, is a major population center with about one-third of the total population of Idaho.

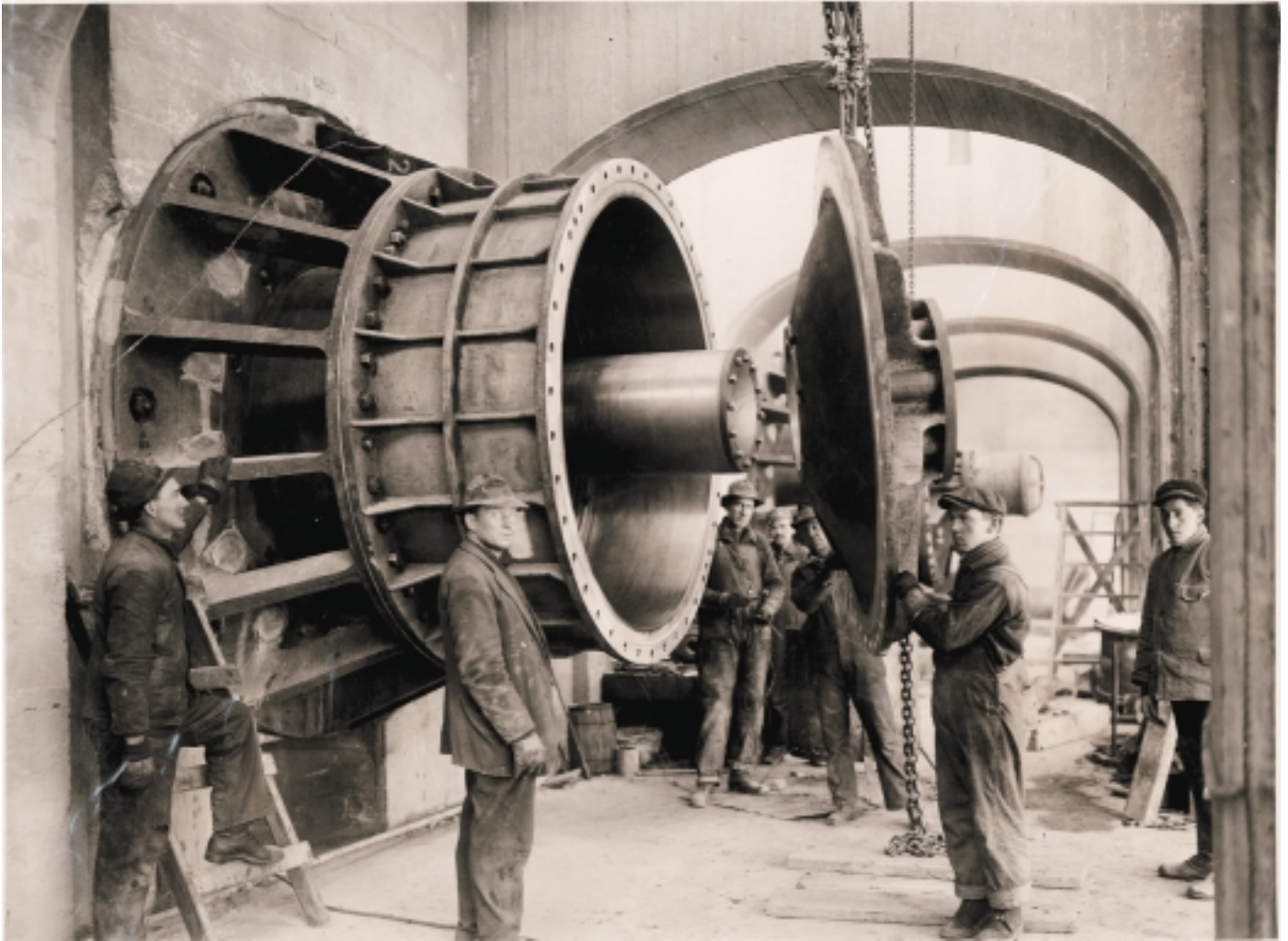


Figure 1-1. View inside the trashrack structure for the lower row of Ensign valves. The Ensign valve in the foreground has been installed on the upstream face of the dam and the valve cover is being moved into place for installation. (December 18, 1914)

Arrowrock Dam and the Boise River Storage System Operation

Arrowrock Dam, located on the main stem Boise River about 17 river miles upstream from the city of Boise, is operated as one of three storage facilities constructed on the Boise River. Anderson Ranch Dam and Reservoir, located on the South Fork Boise River and generally east of Arrowrock Dam, were completed by Reclamation in 1950 as part of the Boise Project. Lucky Peak Dam and Lake, located to the southwest and about 11 river miles downstream of Arrowrock Dam, were completed by the U.S. Army Corps of Engineers (Corps) in 1957.

Reclamation and the Corps operate the three storage dams in a coordinated method for irrigation water supply, flood control, recreation, and fish and wildlife. **Total storage capacity** of the system is about 1,058,300 **acre-feet**: Anderson Ranch Reservoir - 493,200 acre-feet, Arrowrock Reservoir - 272,000 acre-feet, and Lucky Peak Lake - 293,100 acre-feet. Of this total, about 70,000 acre-feet in Anderson Ranch Reservoir and Lucky Peak Lake are **inactive storage**; an additional 29,000 acre-feet in Anderson Ranch Reservoir is **dead storage**. All of the **active storage** space has been contracted to water users or assigned to specific purposes.

The three reservoirs are operated in accordance with the *Water Control Manual for Boise River Reservoirs* (Corps, 1985). This manual, developed jointly by Reclamation and the Corps under the authority of the 1944 Flood Control Act (58 Stat. 887), was adopted by Memorandum of Agreement dated September 25, 1985.

Specific operation of facilities and procedures to be followed at each of the three dams is included in the **Standing Operating Procedures** (SOP) for each facility. These instructions are highly detailed and include a wide variety of information among which are maximum reservoir content allowed, maximum release rates, maximum rate of change of releases, and maintenance and emergency procedures.

Operation of Arrowrock Dam outlet works is constrained by actual and potential **cavitation** damage to the lower Ensign valves and the sluice gates. Ensign valves in the lower row are not to be operated with a **hydraulic head** greater than 100 feet without special permission. The sluice gates may be operated only when the hydraulic head is 50 feet or less. In addition, three of the Ensign valves in the lower row and two of the sluice gates have been taken out of service and are considered inoperable or to be operated only in an emergency.

More detailed information on operations, including reservoir levels and seasonal changes, is discussed in Chapter 3.

Arrowrock Dam Facilities

Arrowrock Dam, located about 11 air miles east of the city of Boise (17 river miles upstream), was completed in 1915 as part of the Boise Project. The Boise Project is a Federal Reclamation project implemented to improve the irrigation water supply which had become over-appropriated. At the time of construction, Arrowrock Dam was the highest dam in the world. By the 1930's, the downstream face of the dam had so badly deteriorated that repairs were necessary. An

18-inch-thick layer of concrete was placed on the downstream face of the dam, the crest was raised 5 feet, and the **drum gates** on the **spillway** were raised 5 feet. This work was completed in 1937.

Figure 1-2 shows the existing Arrowrock Dam and Reservoir. In this photograph, water is being released through some of the upper Ensign valves and through the spillway on the right side of the dam.¹ Access to the Dam and Reservoir is by the Atlanta Road (Idaho Forest Highway 82), a gravel road that follows the right bank of the Boise River from State Highway 21 near the mouth of Mores Creek to the town of Atlanta. As shown in figure 1-2, access to the dam is across a bridge over the spillway to the road that crosses the crest of the dam.

Arrowrock Dam is a concrete, thick-arch structure, 350 feet high with a crest length of 1,150 feet. The crest width is 21.5 feet and the base width at the lowest point of excavation is 223 feet. The outlet works consists of 20 Ensign valves in two horizontal rows, 5 sluice gates, and a concrete spillway channel controlled by 6 drum gates. Figure 1-3 is a general cross section of Arrowrock Dam showing the elevation of the two rows of Ensign valves and the sluice gates. Figure 1-4, a photograph of the upstream side of Arrowrock Dam taken during construction, shows the upper row conduits, Ensign valves not installed, the two **trashrack** structures for the lower row of Ensign valves, and the trashrack structure for the sluice gates.

Throughout this document there are references to the Ensign valves by number. Ensign valves in the lower row are numbered from 1 to 10 starting on the left side of the dam and Ensign valves in the upper row are numbered 11-20 starting on the left side. All of the Ensign valves are 58 inches in diameter and installed on the upstream face of the dam. Seventeen of the conduits (4-20) are 52 inches in diameter and three conduits for valves (1-3) are 72 inches in diameter. The latter were designed for hydropower use that has never been developed.

Arrowrock Dam Maintenance

All of the Ensign valves, and the conduits downstream of those valves, have suffered some cavitation damage, but repairs have kept all the valves in the upper row and most valves in the lower row in service. One of the valves in the lower bank is considered inoperable, i.e., not to be operated under any condition, and two of the valves are to be operated only in an emergency. Through 1974, the sluice gates, which allow draining the reservoir, were operated in all drought years and when the reservoir level was drawn down to less than 50 feet above the sluice gates. Two of the five sluice gates are in need of repair and are to be operated only on a limited basis.

The SOP for Arrowrock Dam (Reclamation, 1999a) requires that the Ensign valves be inspected every 6 years and repaired as necessary. To accomplish the tasks of inspection and repair of the lower row, the reservoir was historically drawn down to elevation 3007 feet using the sluice gates. The last full inspection of the lower Ensign valves was in 1987; repairs were made in 1988. The sluice gates were last operated in 1988 to effect repair of the lower Ensign valves.

¹Left and right, with reference to streams and hydraulic structures, are determined while facing downstream.



Figure 1-2. Arrowrock Dam and Reservoir. Aerial photograph looking upstream showing discharge from the spillway and some of the upper level outlets. Access to the dam is from the road on the left and across the spillway bridge. The road on the right provides access to the down stream side of the dam.
(July 12, 1980)

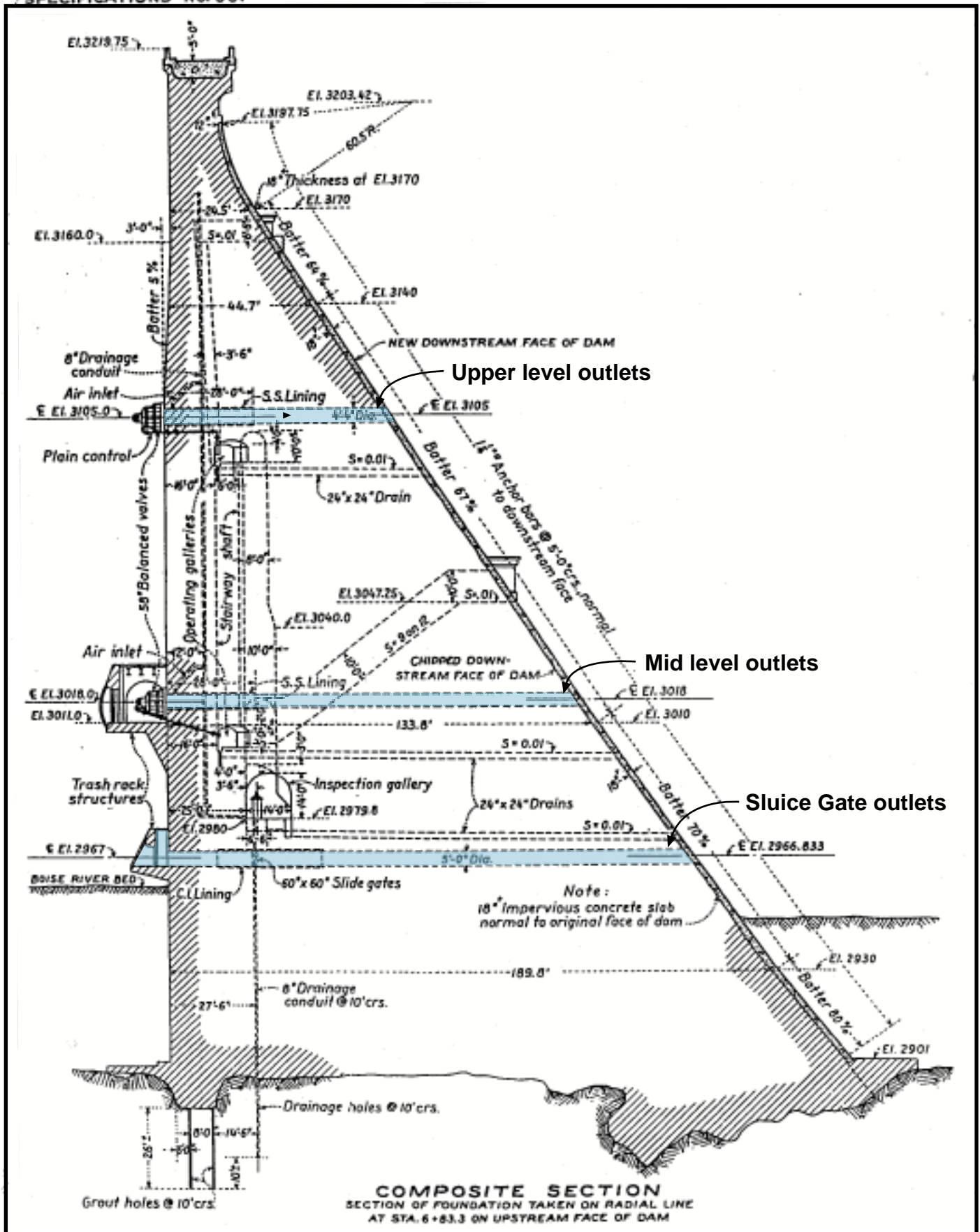


Figure 1-3. Cross-section of Arrowrock Dam from original design drawings.

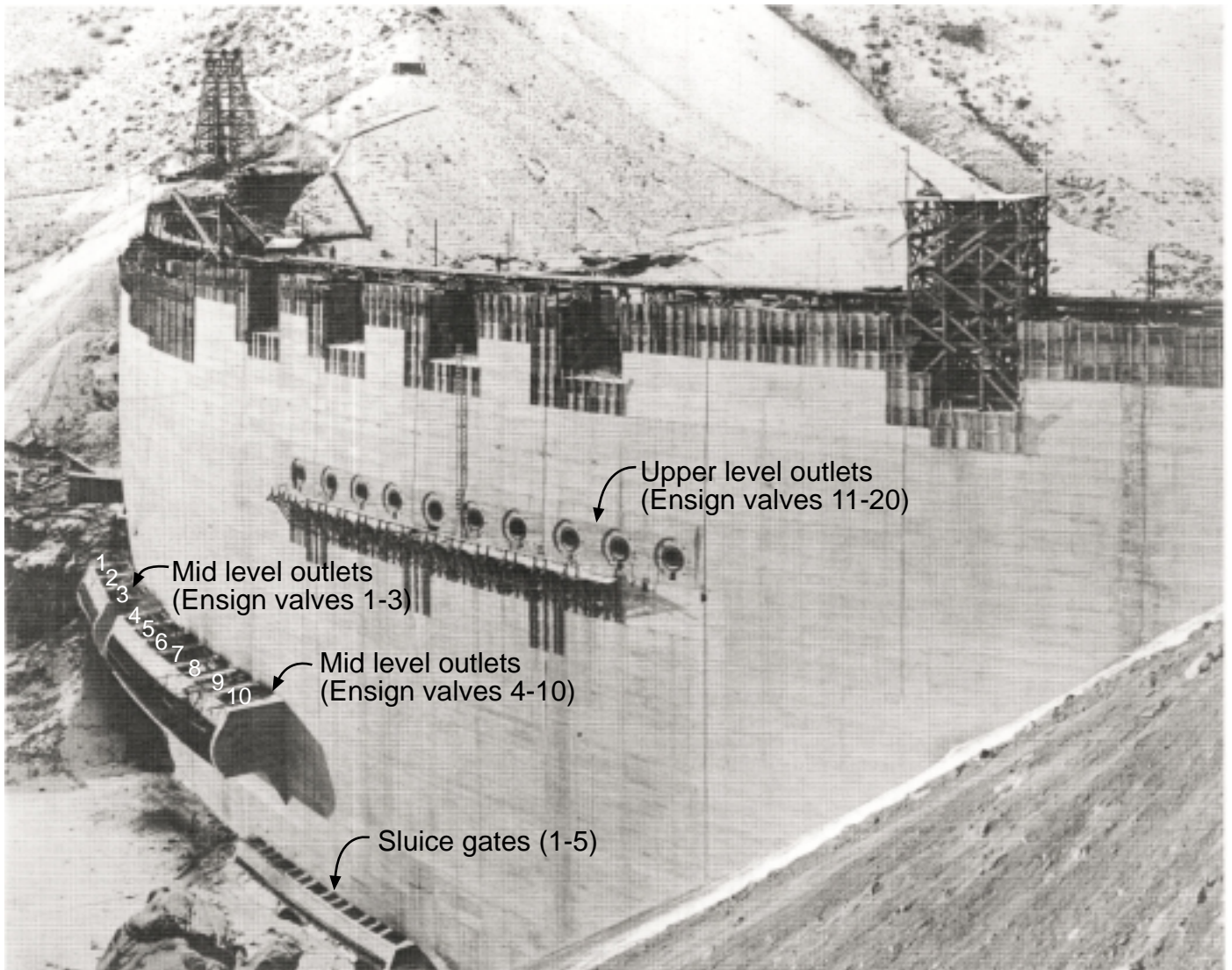


Figure 1-4. View of the upstream side of Arrowrock Dam during construction. The trashrack structure for the sluice gates is visible in the middle of photo above. To the left are the two trashrack structures for the lower row of Ensign valves. Ensign valves for the upper row of conduits have not been installed at this stage of construction. (December 3, 1914)

Inspection and repair of the lower Ensign valves and the sluice gates since 1988 have been deferred largely due to anticipation of developing a program to rehabilitate the outlet works.

The upper Ensign valves, which are normally exposed during part of the year, have been inspected and/or repaired every 1 or 2 years. Extensive cavitation repairs were made to the conduits down stream of the upper row of Ensign valves in 1995, minor repairs were made in 1996, and a complete inspection was made in 1997. Also in 1997, Ensign valve 14 was extensively overhauled due to complete malfunction of the valve. However, additional repairs that may be required were deferred pending a decision on a course of action for rehabilitating the outlet works.

Table 1-1 summarizes some major actions and the most recent maintenance history of the lower Ensign valves and the sluice gates.

Table 1-1. Historical and Recent Maintenance of Lower Ensign Valves and Sluice Gates		
Year	Action	Finding or Result
1940	Inspected the lower Ensign valves	Removed valve #1 from service (inoperable)
1950	Overhauled the sluice gates	
1962	Inspected lower Ensign valves	Most were in good condition
1968	Inspected lower Ensign valves	Most in good condition, some epoxy repairs made
1973	Inspected lower Ensign valves	Most in good condition, some epoxy repairs made
1977	Inspected lower Ensign valves	Most in good condition, some repairs needed
1980	Inspected downstream of sluice gates	Recommended repair of sluice gate #5
1981	Inspected downstream of sluice gates and operated gates	
1987	Inspected sluice gates from downstream	Found some cavitation damage
1987	Inspected lower Ensign valves	Found extensive cavitation damage, removed valves #2 and #3 from service
1988	Lower Ensign valves	Repaired cavitation damage for valves #4-10
1988	Operated and inspected sluice gates	Found considerable erosion and downstream cavitation of gates #3 and #5, recommended that gates #3 and #5 be operated only for limited service

Scoping

The scoping process for this Draft Environmental Impact Statement (DEIS) provided an opportunity for the **public**, governmental agencies, and Tribes to identify their concerns and other issues and helped assure that a full range of potential solutions were identified. To accomplish this, Reclamation (1) published notices in the *Federal Register*, (2) provided information to the public through local media (3) met with potentially affected Indian Tribes,

(4) solicited oral and written comments from the general public and (5) held public meetings. A more detailed discussion of the scoping process is discussed in chapter 4.

Federal Register Notices

Reclamation published a “Notice of intent to prepare an environmental impact statement” in the *Federal Register* on October 20, 1998 (Vol. 63, No. 202, page 56047). The *Federal Register* is available at many libraries and via the Internet. A “Notice of public scoping meeting” was published in the *Federal Register* on November 13, 1998 (Vol. 63, No. 219, page 63493). Prior to issuing the Draft EIS, a “Notice of Availability and Public Hearing” was published in the *Federal Register* on October 26, 2000 (Vol. 65, No. 208, page 64234).

Scoping Document

On November 20, 1998, Reclamation mailed a scoping document to over 100 individuals, organizations, and agencies. The document discussed the deficiencies in the outlet works and a proposal to replace the lower ten Ensign valves with clamshell gates, requested comments, and included an addressed return mailer.

Scoping Meetings

Reclamation held two scoping meetings on December 14, 1998, one in the afternoon (1–3 p.m.) and one in the evening (7–9 p.m.) at the Federal Natural Resources Center building, 1387 S. Vinnell Way, in Boise, Idaho. The date and purpose of the meetings were (1) published in the local newspapers and other media and the *Federal Register*, (2) included in a separate news release, and (3) included in the scoping document identified above. The meetings were held in an informal setting which consisted of presentation of information, with natural resource specialists available to answer questions and take comments after the presentation.

In addition to the two scoping meetings, Reclamation has held other meetings with Federal and State agencies, reservoir spaceholders, and the Shoshone-Bannock, Shoshone-Paiute, and Nez Perce Tribes to discuss rehabilitation of the outlet works (see chapter 4 for additional details).

Results of Scoping

Response to scoping efforts was light; Reclamation received only five letters of comment. Expressed issues and concerns that are within the scope of this EIS are summarized by topic in table 1-2.

Reclamation summarized the comments and issues by topic in a letter mailed to those who commented and other interested individuals and agencies. The letter also identified comments on issues that were beyond the scope of this EIS and whether those issues would be addressed separately during the planning effort. A copy of the letter is included as appendix A.

Table 1-2. Identified Issues and Concerns	
Topic	Issue or Concern
Bull trout (listed under ESA as threatened)	Entrainment Stranding Water quality reduced Reservoir productivity decline Threat to ongoing Idaho State and Federal efforts to reestablish migratory bull trout
Bald Eagle (listed under ESA as threatened)	Loss of forage (fish)
Fish (all species)	Entrainment Stranding Displaced anglers Water quality impaired Reservoir productivity decline Flows in South Fork and lower Boise River adversely changed (lower or higher) Storage in Lucky Peak Lake for winter flows reduced
Wildlife	Wintering deer hazards (ice and mud) increased Waterfowl and shorebirds habitat/food supply reduced Osprey and furbearer habitat/food supply reduced
Hydrology/Water Supply	Operational scenarios fully considered for each alternative (e.g., dry, normal, and wet water years) Effects on Arrowrock storage contractors versus Lucky Peak storage contractors (potential inequity) Refill probability Winter flooding probability
Construction	Time frame for construction Alternatives fully considered
Economics	Discussion of cost allocation Cost comparison of all alternatives including the No Action Effects on irrigators (construction repayment and potential loss of storage) Impacts on recreational fishing
Water Quality	Sedimentation/turbidity increase (reservoirs and Boise River) Impairment of designated uses Effects on irrigators related to lower Boise River Total Maximum Daily Load (TMDL) Compliance with the Clean Water Act (CWA)
Recreation	Loss of fishing opportunities Angler displacement Boating and other water-based recreation opportunities reduced Hunting impacted
Cultural resources	Historic properties adversely affected Traditional cultural properties, sacred sites potentially exposed to damage
Transportation	Road improvements needed

Additional Public Involvement

A public review of the Draft EIS, issued on October 23, 2000, provided additional opportunities for public review and comment for a period of 60 days. Sixteen letters of comments were received. These letters and Reclamation's response can be found in Appendix K. Main areas of concern were economics, safety, dissemination of information/status updates, repayment, water quality, fish, and recreation impacts. Copies of this Final EIS are being sent to the addresses identified by an asterisk in the distribution list (Appendix H). In addition the Final EIS will be published on Reclamation's web page for approximately 1 month after the Record of Decision is published. As a result of the comments received, additional information was developed and analysis as appropriate were conducted for economics, water quality, fish and recreation.

A public informational open house to describe the problems and proposed action of rehabilitation of the outlet works was held on November 2, 2000. Approximately 63 individuals representing the general public, organizations, irrigation districts, Federal, State, and local agencies attended. Areas of main interest were fish and wildlife, economics, and recreation.

Two formal public hearings were conducted at the Idaho State Historical Museum on December 12, 2000. Seven individuals gave formal testimony at the first session, but no one wanted to give any testimony in the second session. Main areas of concern were economics, safety, dissemination of information/status updates, repayment, water quality, fish, and recreation impacts.

Related Actions and Activities

ESA Section 7 Consultation on Reclamation Operation and Maintenance Activities in the Snake River Basin Above Lower Granite Reservoir

In April 1998, Reclamation submitted a Biological Assessment (BA) of operations and maintenance of Reclamation projects in the Snake River Basin above Lower Granite Reservoir to the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS). This document (Reclamation, 1998a) analyzed the effects of normal operation and maintenance activities for Reclamation projects in the Snake River basin, including the Boise River reservoirs, on species listed under the ESA.

In October 1999, the USFWS provided a Biological Opinion (BO) to Reclamation on this BA (USFWS, 1999). In the BO, the USFWS identified reasonable and prudent measures (RPM's) where Reclamation must comply with terms and conditions to be exempt from the prohibitions of Section 9 of the ESA. These terms and conditions are non-discretionary. The USFWS believes the following RPM's are necessary and appropriate to minimize the **take** of bull trout in the Boise River:

- Reduce the incidence of bull trout **entrainment** due to reservoir operations.
- Within existing authorities and voluntary partnership opportunities, work toward ensuring reservoir operations do not result in de-watering of Reclamation reservoirs to the extent that **adfluvial** bull trout resident there during part of their life history are not stressed or killed.
- Investigate methods to provide safe fish passage around Reclamation dams for bull trout, adults, and juveniles.

Beginning in April 1999, Reclamation initiated bi-monthly water quality sampling for a limnology study at Arrowrock Reservoir as part of investigation to potentially establish a conservation pool for Arrowrock Reservoir. Data collected over a 2-year period will be analyzed by a computer reservoir model to quantitatively define the effects of various pool elevations on dissolved oxygen depletion and water temperatures (key parameters relating to availability of salmonid **habitat** in reservoirs).

In the spring of 2000, Reclamation, under direction and guidance of Idaho Department of Fish and Game (IDFG) personnel, used gill nets and trap nets to capture bull trout in Lucky Peak Lake from April through June. Bull trout captured in Lucky Peak Lake were transported to Arrowrock Reservoir, and released. These trap and haul components are recommended by IDFG and USFWS to mitigate for bull trout entrainment through Arrowrock Dam and will be conducted in May of each year through the year 2003.

In an effort to reduce entrainment of bull trout, Reclamation has curtailed the use of the spillway drum gates at Arrowrock Dam. In the past, the drum gates were used to “top off” the reservoir since it is easier operationally to do so. Now, Reclamation is using the upper Ensign valves to adjust releases when filling the reservoir. Use of the spillway cannot be avoided completely as inflow may sometimes exceed the outflow capability of the outlets.

Bull Trout Research, North Fork of the Boise River

Reclamation and the United States Forest Service (USFS) are cooperating on a study of bull trout in the North Fork Boise River; the study began in 1999 and will continue until 2002. The objectives of this study are to: (1) examine the relationship of bull trout with habitat variation in rearing and spawning reaches; (2) quantify the North Fork migratory bull trout population, size, age, and growth structure; and (3) quantify migration patterns.

Arrowrock Dam Parapet Wall Replacement

During the winter of 1999-2000, Reclamation removed the upstream and downstream **parapet** walls which have decayed due to weathering. These walls atop Arrowrock Dam were replaced with reinforced concrete walls constructed to essentially duplicate the design and appearance of the original walls and changes were made to accommodate passage of larger vehicles. This replacement project, which has no effect on the operation of the dam or other possible construction activities, is covered by categorical exclusion checklist prepared by Reclamation.

Replacement of the parapet wall was determined to have an adverse effect upon the dam's historic integrity. **Mitigation** measures related to the historic integrity of the dam have been initiated. The new parapet wall was completed in the spring of 2000.

Arrowrock Bridge Replacement

The 1915 truss bridge spanning the spillway at Arrowrock Dam is scheduled to be replaced by a new bridge located upstream (east) of the existing bridge. The 1915 bridge is included in the National Register designation for the dam. Construction of a new bridge will have an adverse effect upon the dam's historic integrity. Mitigation measures will be to leave the 1915 bridge in place and complete Historic American Engineering Record (HAER) documentation of the dam and bridge. The proposed design of the new bridge is a concrete deck with metal railings oriented to eliminate the sharp turn which has generated problems in the maintenance and repair of facilities. In addition to the bridge, the access road leading from the left abutment to the left toe of the dam will be improved. To help preserve historic integrity, the 1915 bridge will not be removed.

Compliance with NEPA, the National Historic Preservation Act (NHPA), and pertinent other environmental laws will be completed prior to scheduled construction in March 2001; completion is scheduled for July 2001.

Arrowrock Dam Telephone Line Replacement

During the year 2001, Reclamation will replace approximately 6 miles of the existing antiquated telephone line located along the road between Spring Shores Marina and Arrowrock Dam. This replacement, designed to improve voice and data communication with Arrowrock Dam, will consist of replacing the overhead line with a new multi-circuit buried line. This project is scheduled to be completed in conjunction with the Federal Highway Administration project to pave this section of road.

Hydropower Development at Arrowrock Dam

The Federal Energy Regulatory Commission (FERC) licensed the Arrowrock Dam Project (Project No. 4656-013) on March 27, 1989 jointly to the Boise-Kuna, Nampa & Meridian, New York, Wilder, and Big Bend Irrigation Districts. After several unsuccessful attempts to find interested partners for the project, the licensees filed a request for a stay of the March 26, 1999 deadline. The licensees are currently seeking necessary legislation from Congress to formally extend the license. Draft legislation has been submitted and approval is anticipated.

In the spring of 2000, the licensees issued a public request for proposals for interested parties to submit plans for development of power at the site. As of February 1, 2001, a notice of application for amendment of the FERC license was submitted and comments on the proposed amendment were being evaluated. The amendment was an extension of the deadline for completion of construction to March 26, 2003 and that the deadline for completion of construction be extended to March 26, 2005.

Atlanta Road Improvement Project

The Federal Highway Administration, in cooperation with the USFS, Idaho Transportation Department, and the Atlanta Highway District, plans to improve 5.8 miles of the Atlanta Road (Idaho Forest Highway 82) from State Highway 21 to one-half mile west of Arrowrock Dam. The project includes paving the road to provide two lanes with shoulders, adding guardrails and signs, striping, and making minor drainage improvements. Construction is expected to begin in the spring of 2001 and be completed by July 2001.

Legal Authorities and Constraints

The Boise Project was authorized in March 1905 by the Secretary of the Interior under the authority of the Reclamation Act of 1902 (32 Stat. 388), and Arrowrock Dam was approved by the Secretary of the Interior on January 6, 1911. The original purpose of the project and Arrowrock Dam was irrigation and irrigation water supply. Anderson Ranch Dam, upstream of Arrowrock Dam, was authorized by the Secretary of the Interior under the authority of the Reclamation Project Act of 1939 for irrigation, flood control, power, and conservation of fish and recreation. Lucky Peak Dam, downstream from Arrowrock Dam, was constructed by the Corps for flood control and irrigation water supply under authority of the Act of July 24, 1946. The system of three dams is now operated in a coordinated manner to maximize (1) flood control in accordance with the *Water Control Manual for the Boise River Reservoirs* (Corps, 1985), (2) irrigation water supply, and (3) opportunities to enhance fish, wildlife, and recreation. The Water Control Manual identifies system operation for flood control, and the SOP for Arrowrock Dam (Reclamation, 1999a) identifies physical operating parameters and procedures to be followed.

Repayment contracts for Arrowrock and Anderson Ranch storage space and water service contracts for Lucky Peak storage have a major influence on the operation of the river/reservoir system. These contracts between Reclamation and irrigation districts and other spaceholders define annual payments and how the irrigation water supply is to be provided to the contracting entities.

Other laws that are relevant to the proposed action include:

- National Environmental Policy Act (NEPA) of 1969
- The Federal Clean Water Act (CWA), Section 205, 303, 305, 404
- Fish and Wildlife Coordination Act (FWCA) of 1958 (Public Law 85-624)
- Endangered Species Act of 1973 (Public Law 93-205)
- Idaho Stream Channel Protection Act, Title 42, Chapter 38, Idaho Code and Idaho Lake Protection Act, Section 53 et seq., Idaho Code
- U.S. Army Corps of Engineers permit for structures or work in navigable waters, Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403), etc.
- Idaho Water Quality Standards and Wastewater Treatment Requirements (IDAPA 58.01.02)

- The following Federal historical and cultural preservation acts:
 - National Historic Preservation Act (NHPA) of 1966 (Public Law 89-665) as amended (16 U.S.C. 470)
 - Archaeological Resources Protection Act of 1979 (16 U.S.C. 469-469c)
 - Native American Graves Protection and Repatriation Act (NAGPRA) (Public Law 101-601)

Document Organization

This EIS, with minor changes, closely follows the format recommended by the Council on Environmental Quality (CEQ).

Chapter 1 identifies the proposed action, the purpose, and the need for action; provides background information; and summarizes scoping activities and results, related actions and activities, and applicable laws and regulations.

Chapter 2 presents the alternatives and summarizes the process of formulating **action alternatives** and discusses the **No Action** and action alternatives. A comparison of the impacts of the alternatives is included in a matrix table.

Chapter 3 presents the affected environment and relevant resource components that make up the baseline environment and describes the environmental impacts of the alternatives considered in detail and identifies mitigation measures.

Chapter 4 summarizes consultation and coordination activities relevant to this EIS and includes a distribution list for this EIS.

In addition, the following have been included:

A List of Acronyms and Abbreviations (at the front of this EIS)

Bibliography—Chapter 5

List of individuals who helped prepare this EIS—Chapter 6

Glossary of technical terms—Chapter 7

Index—Chapter 8

Appendixes